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Critical revision of some myxomycetes in the Argentinian herbaria BAFC and LIL – 5

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Abstract—Sixty-two collections conserved in the herbaria BAFC and LIL are revised herein. Of the 31 different myxomycete species represented, seven are new records for Argentina. These are *Arcyria affinis*, *Badhamia gigantospora*, *Cribraria purpurea*, *Fuligo intermedia*, *Physarum carneum*, *Physarum javanicum*, and *Physarum penetrale*. The LM and SEM micrographs included illustrate the most representative characters of each species.

Key words—*Amoebozoa,* myxobiota, *Myxogastria*, slime moulds, taxonomy

Introduction

This paper continues the revision of the myxomycete specimens collected mostly in Argentinian territory and deposited in the international herbaria BAFC and LIL. Moreno & al. (2012, 2013a, b, 2015) previously published four papers in this series. The first paper (Moreno & al. 2013a) covered 32 specimens representing 20 taxa deposited in the BAFC herbarium, which preserves 476 myxomycete collections. Moreno & al. (2012) considered 25 specimens representing 15 species, ten of which were deposited in LIL, which

houses 550 myxomycete specimens. Moreno & al. (2013b) next identified 29 species represented by 86 specimens, 41 of which were deposited in AH and 45 in BAFC. Most recently, Moreno & al. (2015) reported 57 specimens representing 26 myxomycete species preserved in BAFC, BA, LIL, and AH.

Materials & methods

The material studied is preserved in the herbarium of the School of Exact and Natural Sciences, University of Buenos Aires, Argentina (BAFC) and the herbarium of the Miguel Lillo Foundation, Tucumán, Argentina (LIL).

The original determination is indicated in square brackets in the Specimen(s) examined section, and the absence of brackets indicates that the specimen had not been determined previously. Revision labels deposited along with the specimens indicate that Eva García Carvajal reviewed a large part of the BAFC collection in 2010, and thus we also cite original determinations, revised determinations, and the reviser's name.

New records for Argentina are marked with an asterisk (*).

The slides mounted in Hoyer's medium for each specimen are preserved in the herbarium of the Universidad de Alcalá, Alcalá de Henares, Madrid, Spain (AH). Spore measurements were made using an oil immersion objective and include surface structures as warts and spines.

Scanning electron microscopy (SEM) micrographs were obtained at the Universidad de Alcalá using a Zeiss DSM-950. For ultramicroscopic studies, one sporocarp was placed on a 2 × 2 cm square of Whatman filter paper no. 1; the paper was folded into a packet to prevent the loss of spores and stapled shut, after which the packeted specimen was rehydrated in concentrated ammonium hydroxide (28–30%) for 30 minutes, dehydrated in aqueous ethanol (70%) for 30 minutes, fixed for two hours in pure ethylene glycol dimethyl ether (= 1,2-dimethoxymethane), immersed in pure acetone for at least two hours, and finally critically point dried and sputtered with gold-palladium. This technique uses very little material (a portion of a single sporocarp or no more than a few spores).

Taxonomy

* ***Arcyria affinis*** Rostaf., Sluzowkce Monogr.: 276. 1875.

LIL 152925 contains scant material. In LIL 152952 the capillitium shows the typical rings, half-rings, and cogs, but we also noted small warts and wider areas on the capillitium. Spores 7–8(–9) µm in diam., nearly smooth, with some evident warts.

Specimens examined: **ARGENTINA, Tucuman**, **Chicligasta**, Los Alisos National Park, 867 m, on wood of "laurel del cerro" *Ocotea porphyria* (Griseb.) van der Werff, 18-V-2015, leg. P. Medina & A. Hladki 698 (LIL 152925); **Tafí**, el Rincón, provincial route 325, 2300 m, 4-IV-2014, leg. C. Izarduy & A. Hladki 5034 (LIL 152952).

Remarks—The capillitial ornamentation of our specimens of *Arcyria affinis* is similar to what was drawn by Nannenga-Bremekamp (1991). A detailed study under SEM of the species was done by Moreno & al. (2018).

Arcyria affinis is a new record for Argentina.

Badhamia affinis Rostaf., Sluzowkce Monogr.: 143. 1874.

Specimen examined: **ARGENTINA, Buenos Aires, Llavallol,** Santa Catalina, Instituto Fitotécnico, 24–XII–1969, leg. J.R. Deschamps [as *Physarum notabile*, rev. Eva García Carvajal as *Badhamia affinis*] (BAFC 22242).

Remarks—Nannenga-Bremekamp (1991) observed that *Badhamia affinis* was characterized by a badhamioid capillitium with roughly parallel and slightly anastomosed calcium carbonate threads. A SEM study of the spore ornamentation of this species was carried out by Moreno & al. (2013a).

Badhamia affinis was cited as occurring in Argentina for the first time by Deschamps (1976b).

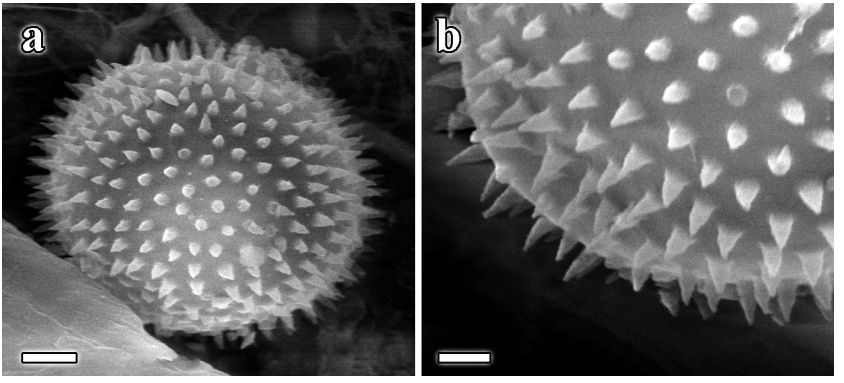

Fig. 1 ***Badhamia gigantospora*** (BAFC 51240):
a. Spiny spore; b. Detail of the spore ornamentation. Scale bars: a = 2 µm; b = 1 µm.

****Badhamia gigantospora*** Ukkola & Härk., Karstenia 36(1): 43. 1996. Fig. 1

BAFC 51240 consists of two boxes containing glued pieces of wood along with a plastic envelope with abundant spores. The collection contains a dozen sporocarps, very mature, so they had lost part of the peridium and capillitium. Stalk cylindrical, widened at the base, pale reddish-brown, about 2 mm high. Sporotheca umbilicate at the base. Capillitium badhamioid, formed by roughly parallel filaments, mostly broken. Spores 13–16 µm in diam., dark violaceous-brown, with remarkable spines. Under SEM the

ornamentation was confirmed as bearing approx. 1 µm long spines, which Rammeloo (1975) described as the echinate type.

Specimen examined: **ARGENTINA, Buenos Aires, Chascomús,** campo "La Alameda", on pieces of wood possibly from a member of the *Palmaceae*, 27–III–2002, leg. Sannazzaro & E. Albertó [as *Physarum pezizoides*, rev. Eva García Carvajal as *Physarum pezizoideum* var. *pezizoideum*] (BAFC 51240).

Remarks—The aforementioned characters place our specimen close to *Badhamia gigantospora,* a species described by Ukkola & Härkonen (1996) from material collected in Africa (Tanzania, Liberia) on the woody debris of *Cupressus lusitanica* Mill. According to the protologue, the species is characterized by large (18–22 µm diam.), dark brown, and very spiny spores (spines approx. 2 µm long). Our Argentinian specimen differs in its smaller (13–16 µm diam.) spores, measurements that fit with those indicated by Lado & al. (2017) for specimens collected in Yasuní (Ecuador) and also identified as *Badhamia gigantospora*.

Badhamia gigantospora is a new record for Argentina.

Craterium leucocephalum (Pers. ex J.F. Gmel.) Ditmar, Deutschl. Fl. Pilze 1(1): 21. 1813. Fig. 2

BAFC 22492 contains abundant sporocarps that are characterized by the whitish, cylindrical columella (not always well developed in mature specimens) and abundant, small, white, subglobose to slightly elongated capillitial nodes. Stalk short, straw colored. Peridium very thin, simple, whitish, easily and irregularly broken. Under SEM, the spore ornamentation consists of short bacula (<0.5 µm long), described by Rammeloo (1974) as the baculate type.

Specimen examined: **ARGENTINA, Buenos Aires, Llavallol,** Santa Catalina, Instituto Fitotécnico, 25–V–1972, leg. R. Vicari [as *Physarum mutabile*, rev. Eva García Carvajal as *P. mutabile*] (BAFC 22492).

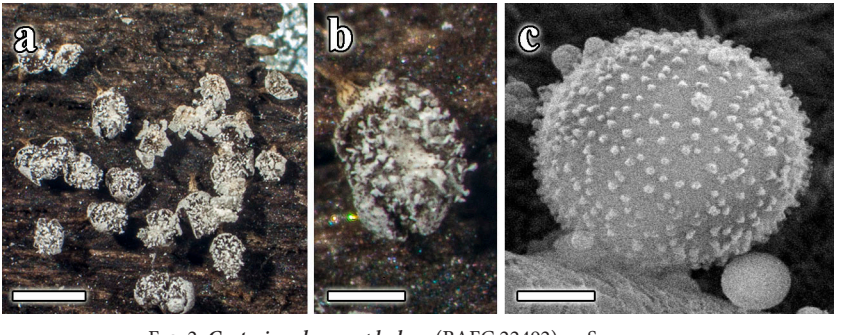

Fig. 2. ***Craterium leucocephalum*** (BAFC 22492): a. Sporocarps; b. Detail of the columella; c. Spore. Scale bars: a = 1 mm; b = 0.5 mm; c = 2 µm.

Remarks—*Craterium leucocephalum* could be confused with *Physarum mutabile* (Rostaf.) G. Lister, which differs in its scanty capillitium nodes, very short stalk, and spinose spores.

The macrographs of our specimen resemble those obtained by Moreno & Oltra (2010).

Craterium leucocephalum is a cosmopolitan species (Martin & Alexopoulos 1969), previously cited as occurring in Argentina by Deschamps (1976b) and Crespo & Lugo (2003).

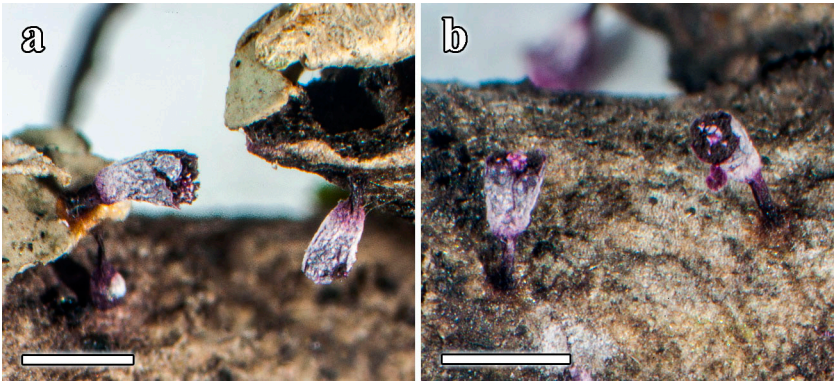

Fig. 3. ***Craterium paraguayense*** (LIL 152953):
a. Sporocarps; b. Sporocarps and pseudocolumella. Scale bars = 1 mm.

Craterium paraguayense (Speg.) G. Lister,
Monogr. Mycetozoa, ed. 2: 95. 1911. Fig. 3

LIL 152953 is associated with twigs and bryophytes. Peridium white-violaceous outside, dark violet inside. Pseudocolumella cylindrical, dark violet, with thick warts.

Specimen examined: **ARGENTINA**, **Salta, General José de San Martín**, Reserva Provincial Acambuco, 867 m, 21–V–2015, leg. P. Medina & A. Hladki 691 (LIL 152953).

Remarks—Spegazzini (1886) described *Craterium paraguayense* from Guarapí (Paraguay), where it occurred on dead leaves of *Luehea grandiflora* Mart. Castillo & al. (2002), who studied the holotype, noted that *C. paraguayense* can be distinguished macroscopically from other *Craterium* species by the violet shades of its cylindrical sporotheca, its violaceous blackish stalk, and 7–9 μm diam. spores—all characters observed in our collection.

Craterium paraguayense was first cited as occurring in Argentina by Arambarri (1975).

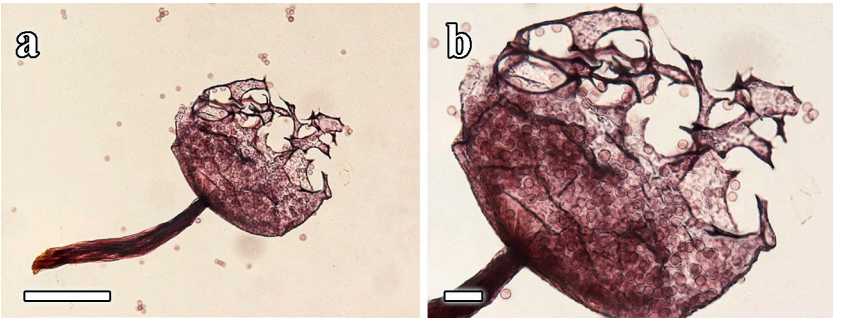

Fig. 4. ***Cribraria purpurea*** (LIL 15294):
a. Sporocarp; b. Detail of the sporotheca. Scale bars: a = 500 µm; b = 100 µm.

* ***Cribraria purpurea*** Schrad., Nov. Gen. Pl.: 8. 1797. Fig. 4

LIL 152954 comprises sporocarps 0.3–0.5 mm high. Sporotheca approx. 0.2 mm diam., dark violet to purple-violet, the basal half completely joining to form a cup and the upper part broken into thick and irregular plates linked by filaments. Stalk short, equal or slightly higher than the sporotheca, cylindrical, blackish. Capillitium absent. Dictydine granules violet. Spores pale violaceous, with warts.

Specimen examined: **ARGENTINA**, **Tucumán, Tafí,** el Rincón, provincial route 325, 2300 m, in ravine with alders (*Alnus acuminata* Kunth), 4–IV–2014, leg. C. Izarduy & A. Hladki 5038 (LIL 152954; with *Physarum robustum*).

Remarks—*Cribraria purpurea* represents a new record for Argentina (https://discoverlife.org). In South America, this species was reported previously as occurring in Venezuela (Lado & al. 2008).

Diachea leucopodia (Bull.) Rostaf., Sluzowkce Monogr.: 190. 1874.

LIL 152956 is slightly sclerotized.

Specimens examined: **ARGENTINA**, **Salta, General José de San Martín,** Reserva Provincial Acambuco, 867 m, 21–V–2015, leg. P. Medina & A. Hladki 690 (LIL 152955); **Tucumán, Tafí,** las Carreras, south of the viewpoint of the Condor, provincial route 325, 2367 m, on bark, 4–IV–2014, leg. C. Izarduy & A. Hladki 5032 (LIL 152956); el Rincón, provincial route 325, 2300 m, in ravine with alders (*Alnus acuminata*), 4–IV–2014, leg. C. Izarduy & A. Hladki 5042 (LIL 153063).

Remarks—*Diachea leucopodia* is a cosmopolitan species that usually produces numerous sporocarps, typically on herbaceous plant debris (Martin & Alexopoulos 1969).

Deschamps (1976a) and Crespo & Lugo (2003) reported *D. leucopodia* for Argentina.

Didymium difforme (Pers.) Gray, Nat. Arr. Brit. Pl. 1: 571. 1821.

The spores of LIL 153113 are 12–14 µm in diam. with a paler zone and very faint warts.

Specimen examined: **ARGENTINA**, **Tucumán, Tafí,** el Rincón, provincial route 325, 26º57′40″S 65º46′34″W, 2300 m, in ravine with alders (*Alnus acuminata*), 4–IV–2014, leg. C. Izarduy & A. Hladki 5043 (LIL 153113).

Remarks—Lizárraga & al (1998), who studied Mexican specimens of *Didymium difforme* under SEM, demonstrated that the warts of this species join to form a subtle reticulum.

Deschamps (1976b) and Crespo & Lugo (2003) previously reported *D. difforme* for Argentina.

Didymium nigripes (Link) Fr., Syst. Mycol. 3: 119. 1829.

BAFC 31015 comprises abundant sporocarps with blackish colored stalks and pseudocolumellas. Peridium hyaline, with brown areolae, covered with stellate calcium carbonate crystals. Stalk longer than the sporothecal diameter, translucent reddish-brown without granules. Spores 9–10 µm in diam., pale violaceous-brown, verrucose with groups of warts.

Specimen examined: **ARGENTINA**, **Misiones, Iguazú**, ruta nac. 12, km. 20, SE harbour Iguazú, on *Psychotria myriantha* Müll. Arg., leg. S. Ferrucci nº 473, det. J.E. Wright [as *Physarum* aff. *pusillum* ex CTES, rev. Eva García Carvajal as *Didymium nigripes*] (BAFC 31015).

Remarks—Deschamps (1976b) and Crespo & Lugo (2003) previously reported *Didymium nigripes* for Argentina.

Didymium squamulosum (Alb. & Schwein.) Fr., Symb. Gasteromyc. 3: 19. 1818.

Most of the specimens have the typical whitish pseudocolumella but in LIL 153177 and LIL 153176 the color of this structure varied from orange to brown-orange. The collection BAFC 22563 contained three boxes—two small boxes with *Didymium squamulosum* and a large one with *Physarum album*.

Specimens examined: **ARGENTINA**, **Buenos Aires, Llavallol,** Santa Catalina, Instituto Fitotécnico, leaf litter of *Ulmus procera*, 9–II–1972, leg. M. Adler [as *Physarum nutans*, rev. Eva García Carvajal as *Didymium squamulosum* with *Physarum* aff. *nutans*] (BAFC 22563; with *Physarum album*); **Tucumán, Chicligasta**, National Park los Alisos, 27°17′30″S 64°51′30″W, 867 m, bay leaf, 18–V–2015, leg. P. Medina & A. Hladki 697 (LIL 153176); **Juan Bautista Alberdi,** dique Escaba, 27°43′37″S

65°47′49″W, 828 m, bay leaf, 8–VI–2015, leg. P. Medina & A. Hladki 692 (LIL 153177); **Tafí,** el Rincón, provincial route 325, 26°57′40″S 65°46′34″W, 2300 m, on twigs and herbaceous debris, 4–IV–2014, leg. C. Izarduy & A. Hladki 5035 [as *Physarum* sp.] (LIL 153178).

Remarks—*Didymium squamulosum* is a cosmopolitan species (Martin & Alexopoulos 1969) that fruits mainly on the debris from herbaceous plants and the leaves of trees. Deschamps (1976b) and Crespo & Lugo (2003) previously reported *D. squamulosum* for Argentina.

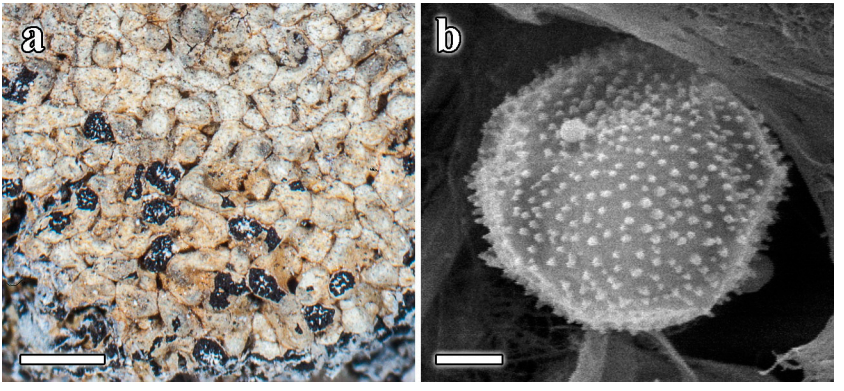

Fig. 5. ***Fuligo intermedia*** (BAFC 22496):
a. Detail of the aethalium; b. Spore. Scale bars: a = 1 mm; b = 2 µm.

* ***Fuligo intermedia*** T. Macbr., N. Amer. Slime-moulds, ed. 2: 30. 1922. Fig. 5

Under SEM, the spore ornamentation of the specimen consists of short (<0.5 µm long) bacula, classified by Rammeloo (1975) as the pileate type.

Specimen examined: **ARGENTINA**, **Buenos Aires, Ezeiza**, on bark of *Populus nigra* L., 12–III–1972, leg. J.R. Deschamps & G. Rovetta [as *Physarum contextum*, rev. Eva García Carvajal as *Fuligo intermedia*] (BAFC 22496).

Remarks—*Fuligo intermedia* is a distinctive species. Lizárraga & al. (2015) described it as an aethalium in which the remains of individual sporocarps can be seen only at the apical part and having large (10–12 µm diam) spores. These characters agree with our specimen. Lizárraga & al. (2015) also noted that the larger spore size helps distinguish *F. intermedia* from *F. septica* (with 6–9 µm diam spores).

Fuligo intermedia is common in North and Central America, but BAFC 22496 is the first collection from South America, making it a new record for both Argentina and the rest of South America (http://discoverlife.org).

Hemitrichia parviverrucospora (Lizárraga, Illana & G. Moreno) G. Moreno & Illana, Mycotaxon 77: 187. 2001. Fig. 6

LIL 153179 exhibits perfectly the complex spore ornamentation typical of this species. The ornamentation consists of a raised wall reticulum that forms a wide mesh with walls sometimes divided to create smaller, independent meshes. The reticulum "valleys" are covered with small (<0.1 μm long) warts that sometimes join in short crests, representative of the cristate reticulate type described by Rammeloo (1974).

Specimen examined: **ARGENTINA**, **Tucumán, Chicligasta,** National Park los Alisos, 27°17′30″S 64°51′30″W, 867 m, on wood debris, 18–V–2015, leg. P. Medina & A. Hladki 695 (LIL 153179).

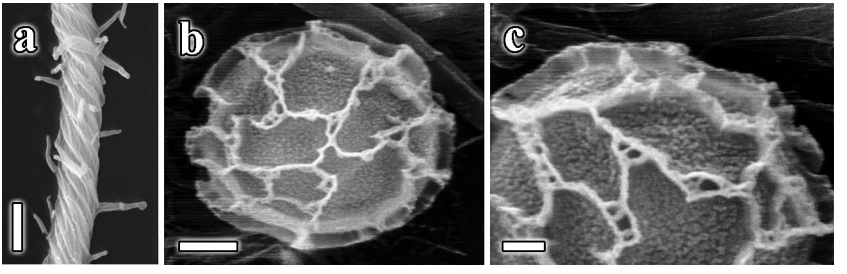

Fig. 6. ***Hemitrichia parviverrucospora*** (LIL 153179):
a. Spiny elater; b. Spore; c. Detail of the spore ornamentation.
Scale bars: a = 5 μm; b = 2 μm; c = 1 μm.

Remarks—*Hemitrichia parviverrucospora,* originally described from Mexico as a variety of *H. serpula* by Lizárraga & al. (1999), was elevated to species by Pérez-Silva & al. (2001).

Hemitrichia parviverrucospora was analyzed molecularly out by Dagamac & al. (2017). Moreno & al. (2012; 2013b; 2015) reported the species from Salta and Tucumán (Argentina).

Mucilago crustacea F.H. Wigg., Prim. Fl. Holsat.: 112. 1780.

Specimen examined: **ARGENTINA**, **Buenos Aires, Ezeiza**, on wood of *Populus nigra* var. *italica* Münchh., 28–IV–1972, leg. J.R. Deschamps & G. Rovetta [as *Physarum didermoides*] (BAFC 22853; with *Physarum didermoides*).

Remarks—Despite *Mucilago crustacea* being cited as cosmopolitan by Martin & Alexopoulos (1969), it has been cited as occurring in Argentina only once previously, by Spegazzini (1926).

Physarella oblonga (Berk. & M.A. Curtis) Morgan,
J. Cincinnati Soc. Nat. Hist. 19(1): 7. 1896.

The peridium and spikes inside the sporotheca are yellow in specimens BAFC 22825 and BAFC 22215 (typical for *P. oblonga*). However, in BAFC 22210, a collection obtained in a moist chamber culture, both the spikes and the peridium are white.

Specimens examined: **ARGENTINA**, **Buenos Aires, Ezeiza**, on bark of *Populus nigra*, IV–1972, leg. J.R. Deschamps, G. Rovetta & Vicari, [as *Physarella oblonga*] (BAFC 22825); **Santa Catalina**, Instituto Fitotécnico, in a moist chamber culture, sector A1, 1–XI–1969, leg. L. Veltri & L. Frias [*as Physarella oblonga*] (BAFC 22210); **Longchamps**, 9–III–1969, leg. M. Adler [as *Physarella oblonga*] (BAFC 22215).

Remarks—Excellent photographs of *Physarella oblonga* were published by Poulain & al. (2011). Crespo & Lugo (2003) cited *P. oblonga* as widely distributed in Argentina.

Physarum album (Bull.) Chevall., Fl. Gén. Env. Paris 1: 336. 1826.

BAFC 22235, which lacks any entire sporocarps, could represent either *Physarum album* or *Physarum javanicum;* we decided to follow the original identification (*Physarum album*).

BAFC 22563 consists of three boxes—two small (containing *Didymium squamulosum*) and a large one with *Physarum album* comprising numerous sporocarps on dry leaves. The whitish sporocarps have a lenticular sporotheca, umbilicate base, and occasional petaloid dehiscence. Capillitium reticulate, with few whitish and fusiform nodes. Spores 10–11 µm diam., violaceous-brown, faintly verrucose with warts in groups.

Specimens examined: **USA, New York,** Clyde, VIII–1889, leg. O.F. Cook, on wood debris [as *Physarum nutans*] (The National Fungus Collection 40, in BAFC 26539); **ARGENTINA**, **Buenos Aires, Llavallol,** Santa Catalina, 15–VI–1969, on wood debris, leg. J.R. Deschamps [as *Physarum nutans*, rev. Eva García Carvajal as *Ph. nutans*] (BAFC 22235); on leaf litter of *Ulmus procera*, 9–II–1972, leg. M. Adler [as *Physarum nutans*, rev. Eva García Carvajal as *Physarum* aff. *nutans* with *Didymium squamulosum*] (BAFC 22563; with *Didymium squamulosum*).

Remarks—*Physarum album*, a cosmopolitan species (Martin & Alexopoulos 1969), was previously cited as occurring in Argentina by Crespo & Lugo (2003).

Physarum bivalve Pers., Ann. Bot. (Usteri) 15: 5. 1795. Fig. 7

BAFC 30408 and BAFC 30409 (collected in New York in 1888 and 1889) are kept in tiny boxes with numerous perfectly conserved plasmodiocarps. The faintly warted spores of BAFC 30408 are 9–10 µm in diam.

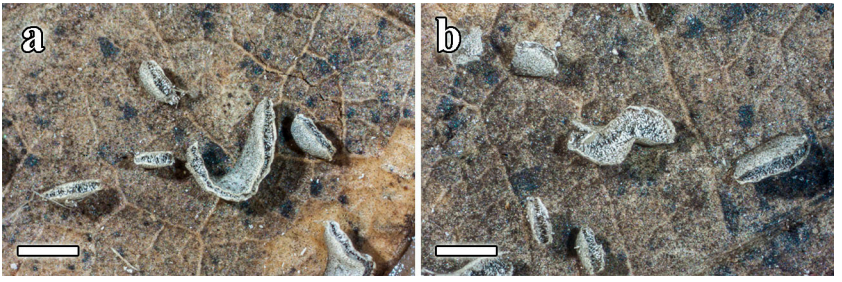

Fig. 7 ***Physarum bivalve*** (BAFC 30408):
a. Detail of the sporocarps; b. Capillitium nodes. Scale bars = 1 mm.

Specimens examined: **USA, New York,** V–1888, on leaves, leg. O.F. Cook 665 [as *Physarum bivalve*] (BPI 3754 in BAFC 30408); Jamesville, on leaves, VII–1889, leg. O.F. Cook 298 [as *Physarum bivalve*] (BPI 3753 in BAFC 30409).

Remarks—*Physarum bivalve* could be confused with *Physarum loratum* Shuang L. Chen & al. (Chen & al. 1999), which differs in its apical and well-developed line of dehiscence and larger (10.4–11.7 µm diam.) spores.

Physarum bivalve was cited as occurring in North America by Martin & Alexopoulos (1969).

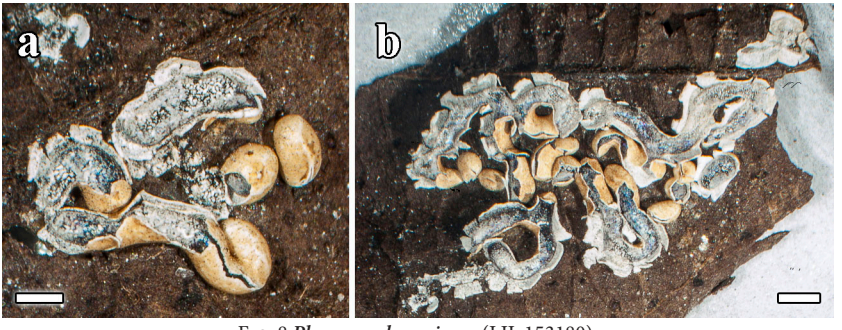

Fig. 8 ***Physarum bogoriense*** (LIL 153180):
a, b. Sporocarps and capillitium nodes. Scale bars = 1 mm.

Physarum bogoriense Racib., Hedwigia 37(1): 52. 1898. Fig. 8

Specimen examined: **ARGENTINA, Tucumán, Tafí,** el Potrerillo, 26°57′31″S 65°43′34″W, 2167 m, in ravine, on birch leaf, 5–IV–2014, leg. C. Izarduy & A. Hladki 5040 (LIL 153180).

Remarks—*Physarum bogoriense* share microscopically similar spores and calcareous nodes with *P. hongkongense* Chao H. Chung. Macroscopically, *P. bogoriense* sporocarps vary from plasmodiocarpous to sporangiate forms

that are not compressed laterally and bear an apical dehiscence. The peridial dehiscence leaves a revolute, petaloid structure. In contrast, *P. hongkongense* plasmodiocarps are compressed laterally and the edges of the peridial dehiscence are clean cut, neither revolute nor petaloid.

Deschamps (1976b) cited one occurrence of *Physarum bogoriense* for Argentina.

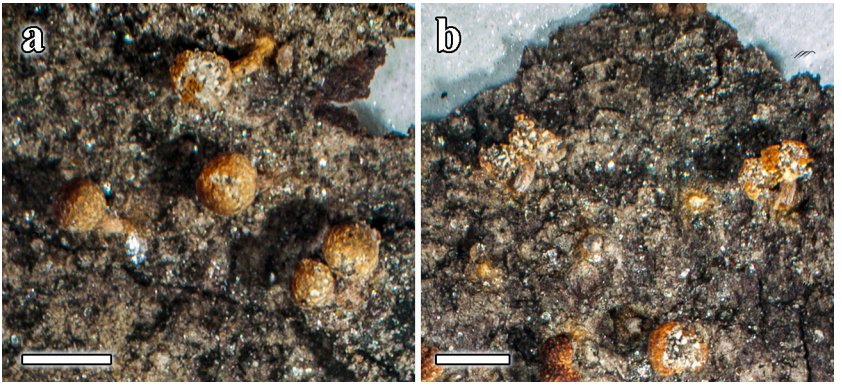

Fig. 9 ***Physarum carneum*** (LIL 153181):
a. Sporocarps; b. Capillitium nodes. Scale bars = 1 mm.

* ***Physarum carneum*** G. Lister & Sturgis, J. Bot. 48: 73. 1910. Fig. 9

LIL 153181 consists of stalked sporocarps, 1–1.5 mm tall overall. Sporotheca globose to subglobose, 0.4–0.8 mm diam. Stalk wide, cylindrical, as tall as the sporotheca, concolorous with the peridium, sometimes with lilac shades. Hypothallus orange-brown and membranous. Peridium simple, orange-brown to pinkish-brown, with granules, breaking apart in an irregular and tessellated manner. Capillitium physaroid with large white nodes, rounded to shortly elongated, linked by hyaline filaments. Pseudocolumella absent. Spores 8.5–10 µm diam., violaceous-brown, verrucose.

Specimens examined: **ARGENTINA**, **Tucumán,** Tafí, el Potrerillo, 26°57′31″S 65°43′34″W, 2167 m, on wood debris, 5–IV–2014, leg. C. Izarduy & A. Hladki 5044 (LIL 153181).

Remarks—*Physarum carneum* has been rarely collected in North America according to Martin & Alexopoulos (1969), and we have not found any records from South America in the literature. Therefore, our specimen is a new record for Argentina and South America.

Physarum cinereum (Batsch) Pers., Neues Mag. Bot. 1: 89. 1794.

BAFC 22239 consists of a glass Petri dish with an evident plasmodium track and a few sporocarps. BAFC 22871 has abundant but broken sporocarps that retain only a few spores and scant capillitium. The remaining collections (BAFC 22857, BAFC 22844, BAFC 22236) contain abundant and well-developed and preserved sporocarps. These collections well illustrate the wide variation from sporangiate to plasmodiocarpous forms and the typical capillitium with small nodes.

Specimens examined: **ARGENTINA**, **Buenos Aires, Lanús**, over the grass, X–1968, leg. L. del Busto, in petri dish [as *Physarum cinereum*] (BAFC 22239); **Llavallol**, Santa Catalina, on bark of *Ulmus procera* in a moist chamber culture, 3–XI–1968, leg. J.E. Wright & J.R. Deschamps [as *Physarum cinereum*] (BAFC 22236); Instituto Fitotécnico, 21–V–1972, on twigs, leg. J.R. Deschamps, G. Rovetta & Vicari [as *Physarum cinereum*] (BAFC 22844); on twigs and leaves, 21–V–1972, leg. J.R. Deschamps & G. Rovetta [as *Physarum cinereum*] (BAFC 22871); **Malaver,** on *Poaceae*, 24–III–1973, leg. A. Méndez [as *Physarum cinereum*] (BAFC 22857).

Remarks—*Physarum cinereum* is a cosmopolitan species (Martin & Alexopoulos 1969), cited as occurring in Argentina by Deschamps (1976b) and Crespo & Lugo (2003).

Physarum compressum Alb. & Schwein., Consp. Fung. Lusat.: 97. 1805.

The spores of our five specimens are 10–12 µm diam.

Specimens examined: **ARGENTINA**, **Buenos Aires, Capital Federal**, on dead trunk of *Melilotus officinalis*, 9–VII–1940, leg. A. Burkart [as *Physarum compressum*, rev. Eva García Carvajal as *P. compressum*] (BAFC 22490); **Laguna Vitel**, on *Palmaceae*, 11–X–1968, leg. J.R. Deschamps [as *Physarum compressum*, rev. Eva García Carvajal as *P. compressum*] (BAFC 22228); **Llavallol,** Santa Catalina, Instituto Fitotécnico, on spathe de *Palmaceae*, 16–IV–1972, leg. J.R. Deschamps & G. Rovetta [as *Physarum compressum*, rev. Eva García Carvajal as *Ph. compressum*] (BAFC 22867); **Longchamps**, plant debris, 10–X–1968, leg. M. Adler [as *Physarum compressum*] (BAFC 22139 with *Didymium bahiense)*; **Misiones, Iguazú,** ruta nac. 12, km. 30, SE harbour Iguazú, on bark of *Nectandra saligna*, in mixed forest of *Aspidosperma polyneuron*, 28–X–1973, leg. J.E. Wright, J.R. Deschamps & I. del Busto [as *Physarum compressum*] (BAFC 23195).

Remarks—Our spore measurements for *Physarum compressum* match those cited by Martin & Alexopoulos (1969). However, Nannenga-Bremekamp (1991) cited larger (12–14 µm diam.), while Poulain & al. (2011) reported spores measuring 11–15 µm in one collection and 9.5–11.5 µm in a different one.

Crespo & Lugo (2003) reported *P. compressum* as frequent in Argentina.

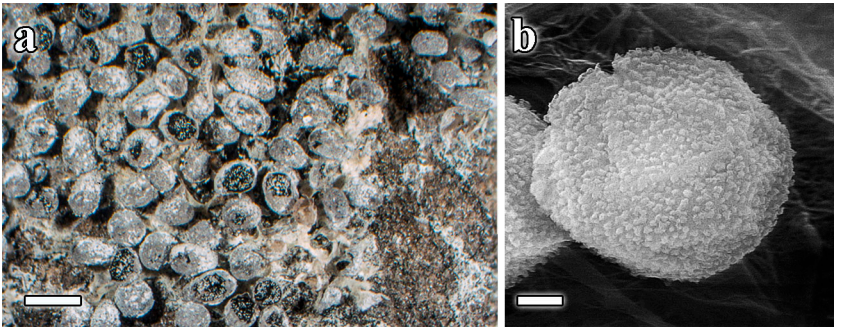

Fig. 10 ***Physarum didermoides*** (BAFC 22839): a. Sporocarps; b. Spore. Scale bars: a = 1 mm; b = 2 µm.

Physarum didermoides (Pers.) Rostaf., Sluzowce Monogr. 97. 1874. Fig. 10

BAFC 22549 displays the typical easily breaking exoperidium and cylindric sporocarps with a slimy, white yellowish hypothallus. Pseudocolumella whitish and elongated. Spores 13–15 µm in diam., strongly verrucose. Most of the spores in BAFC 22602 and BAFC 22267 are collapsed, thus exhibiting marks that give them an atypical polygonal shape.

Under SEM, the spore ornamentation consists of <0.5 µm long warts joined into short crests of 2–3–4 warts, classified by Rammeloo (1975) as the verrucate type.

Specimens examined: **ARGENTINA**, **Buenos Aires, Capital Federal,** Saavedra park, on bark of *Morus alba*, IV–1972, leg. J.R. Deschamps & J.E. Wright [as *Physarum didermoides*, rev. Eva García Carvajal as *P. didermoides*] (BAFC 22870); **Ezeiza**, leg. Falcone [as *Physarum didermoides*, rev. Eva García Carvajal as *P. didermoides* cf.] (BAFC 22549); on wood, 14–IV–1971, leg. Vinka Kohn [as *Physarum didermoides*] (BAFC 22839); on bark of *Populus nigra*, 12–III–1972, leg. J.R. Deschamps & G. Rovetta [as *Physarum didermoides*] (BAFC 22868); on trunks of *Populus nigra* var. *italica* with *Mucilago crustacea*, 28–IV–1972, leg. J.R. Deschamps & G. Rovetta [as *Physarum didermoides*] (BAFC 22853); **Llavallol,** Santa Catalina, Instituto Fitotécnico, 15–VII–1969, on bark, leg. J.R. Deschamps [as *Physarum didermoides*, rev. Eva García Carvajal as *P. didermoides*] (BAFC 22227); Santa Catalina, 10–X–1969, leg. J.R. Deschamps [as *Physarum didermoides*] (BAFC 22142); Santa Catalina, Instituto Fitotécnico, 3–X–1970, leg. J.R. Deschamps, on bark [as *Physarum didermoides*] (BAFC 22267); **Corrientes, Saladas**, Santa Lucía river, on bark, 15–VIII–1972, leg. J.R. Deschamps [as *Physarum didermoides*] (BAFC 22602).

Remarks—*Physarum didermoides* could be confused with *P. spectabile* Nann.-Bremek. & al., which differs in its succulenticolous habit (occurring mainly on the cladodes of *Opuntia* Mill.), its thin exoperidium, abundant and tiny capillitial nodes, and its polygonal spores (12–13.5 µm diam.).

Crespo & Lugo (2003) reported *P. didermoides* as widely distributed in Argentina.

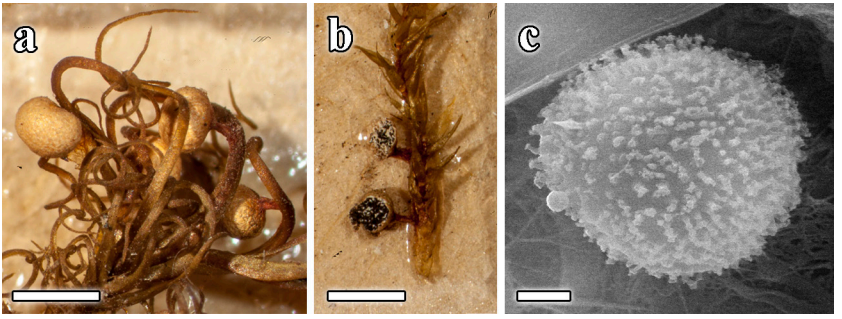

Fig. 11 ***Physarum flavidum*** (BAFC 30410):
a. Sporocarps; b. Capillitium nodes; c. Spore. Scale bars: a, b = 1 mm; c = 2 µm.

Physarum flavidum (Peck) Peck, Annual Rep.
New York State Mus. Nat. Hist. 31: 55. 1879. Fig. 11

BAFC 30410 contains gregarious sporocarps with a globose, yellowish to yellowish-brown sporotheca. Peridium double, fragile, outer layer with granules of calcium carbonate. Stalk short to very short, reddish-orange, translucent. Capillitium with elongated white nodes. Spores 10–12 µm diam, spinulose. Under SEM, the spore ornamentation baculate with coralloid tips.

Specimen examined: **USA, Washington D.C.,** on to bryophytes, leg. M.B. Waite [as *Physarum flavidum*] (BAFC 30410 ex BPI 3796).

Remarks—The Argentinian material of *Physarum flavidum* was collected from similar habitat described by Martin & Alexopoulos (1969)—bryophytes and dead wood. The species, originally described from the United States, is widely distributed on both coasts of North America (https://discoverlife.org).

* ***Physarum javanicum*** Racib., Hedwigia 37(1): 53. 1898. Fig. 12

The best-preserved material, BAFC 22535, contains abundant sporocarps with umbilicate sporothecas and very long grey-white stalks, (measuring more than three times the height of the sporotheca). Peridial dehiscence irregular to stellate. Capillitial nodes small and whitish. Spores 8–10 µm diam., pale violaceous-brown, verrucose with groups of darker warts.

LIL 693 consists of flattened sporocarps crushed and stuck to the substrate making the umbilicate sporotheca difficult to observe; the length of the stalks confirms the material as *Physarum javanicum*.

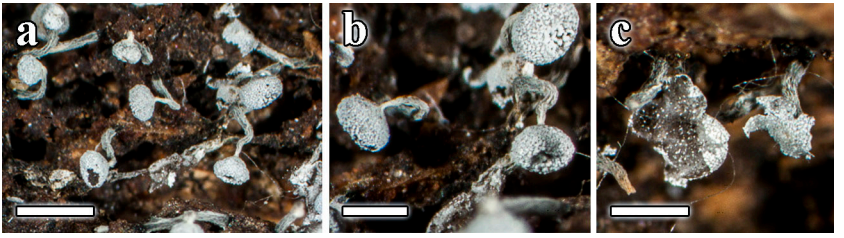

Fig. 12 ***Physarum javanicum*** (BAFC 22535):
a. Sporocarps; b. Detail of the umbilicate sporotheca; c. Whitish capillitium nodes.
Scale Bars: a = 1 mm; b, c = 0.5 mm.

Specimens examined: **ARGENTINA**, **Buenos Aires, Llavallol**, Santa Catalina, Instituto Fitotécnico, 3–IV–1971, leg. Arguijo [as *Physarum nutans*, rev. Eva García Carvajal as *P. nutans*] (BAFC 22535); **Tucumán**, **Juan Bautista Alberdi**, dique Escaba, 27°43′37″S 65°47′49″W, 828 m, on leaf of "laurel del cerro" (*Ocotea porphyria*), 8–VI–2015, leg. P. Medina & A. Hladki 693 (LIL 153182).

Remarks—The mature, well-developed specimens of *Physarum javanicum* recall the photos in Poulain & al. (2011). According to https://discoverlife.org *Physarum javanicum* was previously cited from South America only in Brazil and French Guyana. Our report represents a new record for Argentina.

Physarum leucophaeum Symb. Gasteromyc. 3: 24. 1818.

Specimen examined: **USA**. **Oregon**, **Benton County**, Fall Creek State Fish Hatchery, on moss covered decaying logs, 24–VIII–1962, leg. Lee Bonar, C.T. Rogerson, & M.L. Farr [as *Physarum leucophaeum* and confirmed by Eva García Carvajal] (BPI 3803 in BAFC 30411).

Remarks—*Physarum leucophaeum* was cited as occurring in Argentina by Crespo & Lugo (2003).

* ***Physarum penetrale*** Rex, Proc. Acad. Nat. Sci. Philadelphia 43: 389. 1891. Fig. 13

LIL 153183 contains well-developed sporocarps with a long, cylindrical, orange-brown columella, translucent under transmitted light and without calcium carbonate. Sporotheca wide open, so most spores have been lost. Capillitium with tiny, yellowish nodes. Spores 6.5–7.5 µm diam., pale brown, verrucose with warts in groups.

Specimen examined: **ARGENTINA**, **Tucumán, Chicligasta**, National Park los Alisos, 27°17′30″S 64°51′30″W, 867 m, on wood of *Ocotea porphyria*, 18–V–2015, leg. P. Medina & A. Hladki 696 (LIL 153183; with *Xylaria* sp.).

Remarks—*Physarum penetrale* is a new record for Argentina.

Fig. 13 ***Physarum penetrale*** (LIL 153183):
a. Sporocarps and columella; b. Sporocarp, columella, and capillitium;
c. Detail of columella and capillitium. Scale bars: a, b = 1 mm; c = 100 µm.

Physarum pusillum (Berk. & M.A. Curtis) G. Lister,
Monogr. Mycetozoa, ed. 2: 64. 1911. Fig. 14

BAFC 22279 contains abundant well-developed and typical sporocarps. Sporotheca lenticular, umbilicate at the base. Stalk dark brown. Peridium whitish with calcium carbonate granules and a pale brown base. Capillitium with elongated and whitish nodes. Spores 10–12 µm diam., verrucose with warts in groups.

Although a second specimen (BAFC 22876) is well-developed, the capillitium is badhamioid due to the large nodes, the spores are larger (11–14 µm diam.), and the ornamentation on the spores is fainter.

Under SEM, short (<0.5 µm long) bacula were observed, the pilate type as described by Rammeloo (1975).

Specimens examined: **ARGENTINA, Buenos Aires, Laguna Vitel**, on debris of a member of the *Palmaceae*, X–1969, leg. J.R. Deschamps [as *Physarum pusillum,* rev,

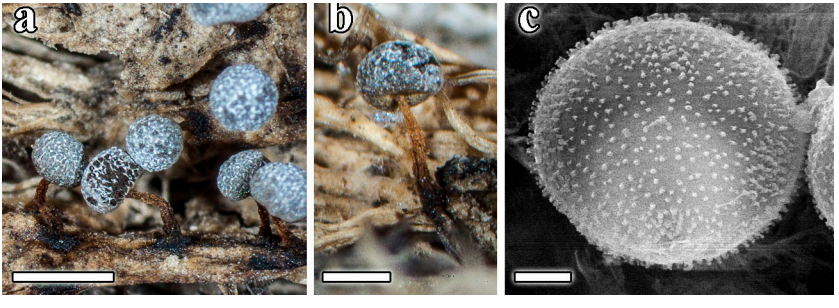

Fig. 14 ***Physarum pusillum*** (BAFC 22876):
a. Sporocarps and capillitium; b. Detail of the umbilicate sporotheca; c. Spore.
Scale bars: a = 1 mm; b = 0.5 mm; c = 2 µm.

Eva García Carvajal *P. pusillum*] (BAFC 22279); on palm decaying, 3–VIII–1968, leg. J.R. Deschamps [as *Physarum pusillum,* rev. Eva García Carvajal *P. pusillum*] (BAFC 22231); **Manzanares**, on spathe of *Palmaceae*, 1–V–1972, leg. G. Cohen [as *Physarum pusillum,* rev. Eva García Carvajal *P. pusillum*] (BAFC 22876).

Remarks—*Physarum pusillum* is a cosmopolitan species (Martin & Alexopoulos 1969). Crespo & Lugo (2003) cited it as widely distributed in Argentina.

Physarum robustum (Lister) Nann.-Bremek.,
Proc. Kon. Ned. Akad. Wetensch., C. 76(5):484 (1973)

LIL 153185 has stalked sporocarps; peridium membranous with granules coming from protrusions of the capillitium nodes, which are joined in the center of the sporotheca, forming a pseudocolumella with a variable morphology; spores 10–12 µm diam., violaceous-brown, verrucose.

LIL 153184 has abundant and whitish calcareous capillitium nodes with a variable morphology, but a pseudocolumella is present in only a few sporocarps.

Specimens examined: **ARGENTINA**, **Tucumán, Tafí,** el Rincón, provincial route 325, 26°57′40″S 65°46′34″W, 2300 m in ravine with alders (*Alnus acuminata*), 4–IV–2014, leg. C. Izarduy & A. Hladki 5033 (LIL 153184); 5038 (LIL 153185; with *Cribraria purpurea*).

Remarks—The spores in both specimens of *Physarum robustum* are 10–12 µm diam., which match those cited by Nannenga-Bremekamp (1991). Poulain & al. (2011) reported slightly smaller (9–10.5 µm diam.) spores.

Physarum robustum could be confused with *P. leucophaeum* and *P. album*. The main difference in *P. leucophaeum* is its lower number of calcium carbonate nodes, leading us to suspect that *P. robustum* and *P. leucophaeum* represent extreme variants of the same species.

Physarum album can be distinguished by its delicate sporocarps, lower number of capillitial nodes, and the stellate dehiscence.

Moreno & al. (2013b) and Lado & al. (2014) previously reported *P. robustum* for Argentina.

Physarum roseum Berk. & Broome, J. Linn. Soc., Bot. 14: 84. 1873. Fig. 15

BAFC 26540 contains abundant, well-developed sporocarps, with a globose sporotheca showing the typical purple color with pink shades. Capillitium filamentous with small, purple nodes. Spores 7–8 µm diam., violaceous-brown, verrucose with warts in groups.

Specimen examined: **USA, Maryland,** Beltsville, on decaying logs, twigs, leaves, etc., 7–VIII–1969, leg. & det. M.L. Farr 4062 [as *Physarum roseum*] (BAFC 26540).

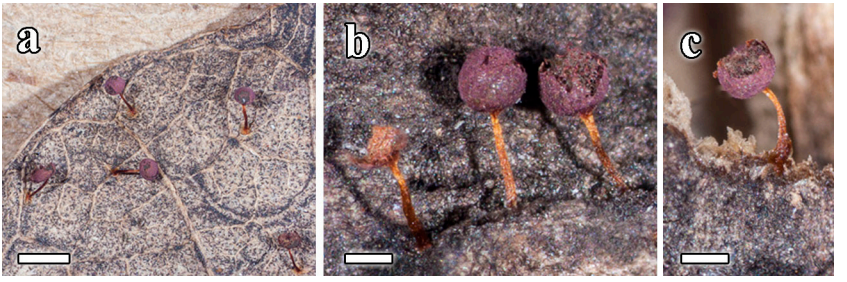

Fig. 15 ***Physarum roseum*** (BAFC 26540):
a. Sporocarps; b, c. Detail of sporocarps and capillitium. Scale bars: a = 1 mm; b, c = 0.5 mm.

Remarks—Martin & Alexopoulos (1969) indicated that *Physarum roseum* is closely related to *P. pulcherrimum* Berk. & Ravenel., which produces violet instead of pinkish sporocarps (see macro- and micrographs of *P. pulcherrimum* in Moreno & al. (2014) for color comparison).

Our material of *P. roseum* resembles that photographed by Poulain & al. (2011). Martin & Alexopoulos (1969) cited *P. roseum* as occurring in North America.

Stemonitis smithii T. Macbr., Bull. Iowa Univ. Lab. Nat. Hist. 2(4): 381. 1893.

LIL 153186 displays the characters typical of the species, including a well-developed external mesh in the periphery of the capillitium, a cylindrical hollow stalk, and spores 4–5 µm diam., pale violaceous-brown, almost smooth to slightly verrucose.

Specimen examined: **ARGENTINA**, **Tucumán, Chicligasta**, National Park los Alisos, 867 m, on wood of *Ocotea porphyria*, 18–V–2015, leg. P. Medina & A. Hladki 699 (LIL 153186).

Remarks—Moreno & al. (2013a) carried out a SEM study of other Argentinian specimens of *Stemonitis smithii*. *Stemonitis smithii* is rarely cited as occurring in Argentina according to Crespo & Lugo (2003).

Trichia crateriformis G.W. Martin, Mycologia 55(1): 131. 1963. Fig. 16

= *Trichia fallax* var. *olivacea* Meyl., Bull. Soc. Vaud. Sci. Nat. 44: 300. 1908.

≡ *Trichia decipiens* var. *olivacea* (Meyl.) Meyl., Bull. Soc. Vaud. Sci. Nat. 55: 244. 1924.

≡ *Trichia decipiens* f. *olivacea* (Meyl.) Y. Yamam., Myxomyc. Biota Japan.: 237. 1998.

LIL 153187 contains five well-developed sporocarps. Capillitium formed by elaters, 5–6 µm diam., with quite long tips. Spores 10–11 µm diam. with short crests. Under SEM, the spore ornamentation is formed by ≤0.5 µm long bacula joined into sinuous and irregular crests.

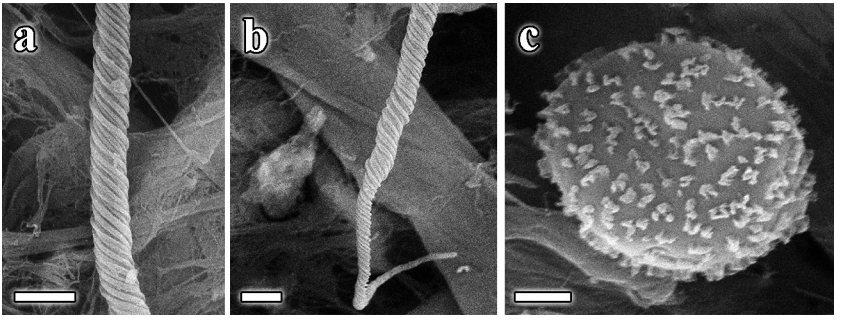

Fig. 16 ***Trichia crateriformis*** (LIL 153187):
a. Capillitium; b. Tip of one elater; c. Spore. Scale bars: a, b = 5 µm; c = 2 µm.

Specimen examined: **ARGENTINA**, **Tucumán, Tafí,** el Potrerillo, 2167 m, on wood debris, 5–IV–2014, leg. C. Izarduy & A. Hladki 5041 (LIL 153187).

Remarks—Moreno & Castillo (2013) explained the priority of the epithet *crateriformis* for the species and how *T. crateriformis* differs from *T. decipiens,* with which it is often confused.

Trichia crateriformis was cited once (as *Trichia pusilla*) as occurring in Tierra del Fuego (Argentina) by Arambarri (1975); this record was later revised by Moreno & al. (2013a) as *Trichia decipiens* var. *olivacea*.

Trichia scabra Rostaf., Sluzowce Monogr. 258. 1875. Fig. 17

LIL 153188 consists of four small pieces of wood, bearing 2–4 sporocarps on each piece. Sporocarps sessile, golden-brown. Peridium simple, very thin, iridescent. Capillitium orange-brown to orange-yellowish, formed by 3–4 µm diam. elaters, ending in a very short tip with a small appendage; under LM the protruding elater spirals appeared to bear short spinules, but no spinules were seen under SEM. Spores 12–13 µm diam., with a low walled reticulum forming abundant meshes. SEM study, which confirmed this ornamentation, also revealed small holes in the walls, described as the simple reticulate with perforated muri type by Rammeloo (1974).

Specimen examined: **ARGENTINA**, **Tucumán, Tafí,** el Rincón, provincial route 325, 2300 m, on bark of *Alnus acuminata*, 4–IV–2014, leg. C. Izarduy & A. Hladki 5039 (LIL 153188).

Remarks—*Trichia scabra* was cited as occurring in Argentina for the first time by Grosso (1981) and later by Lado & al. (2014), who conducted a SEM study of the spore ornamentation, defining it as "reticulum made up of non-pitted narrow muri," and the elaters "decorated with 3–4 spiny bands."

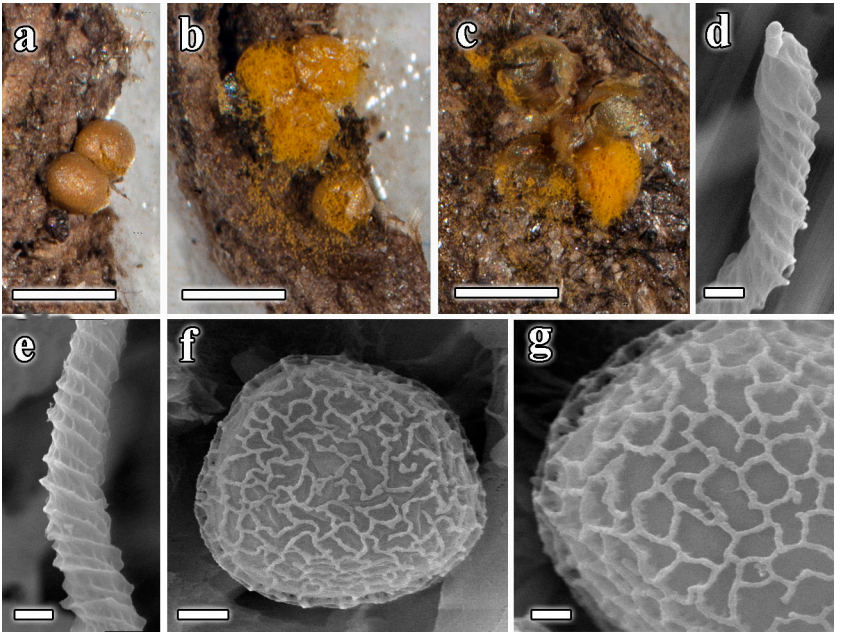

Fig. 17 ***Trichia scabra*** (LIL 153188): a–c. Sporocarps and capillitium; d, e. Capillitium; f. Spore; g. Detail of the spore ornamentation. Scale bars: a–c = 5 mm; d–f = 2 µm; g = 1 µm.

In contrast, our specimen shows the reticulated spores with holes on the walls and smooth elaters. Collections of this species from Taiwan (China) (Liu 1982) displayed the same characters as our specimen.

Acknowledgements

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